

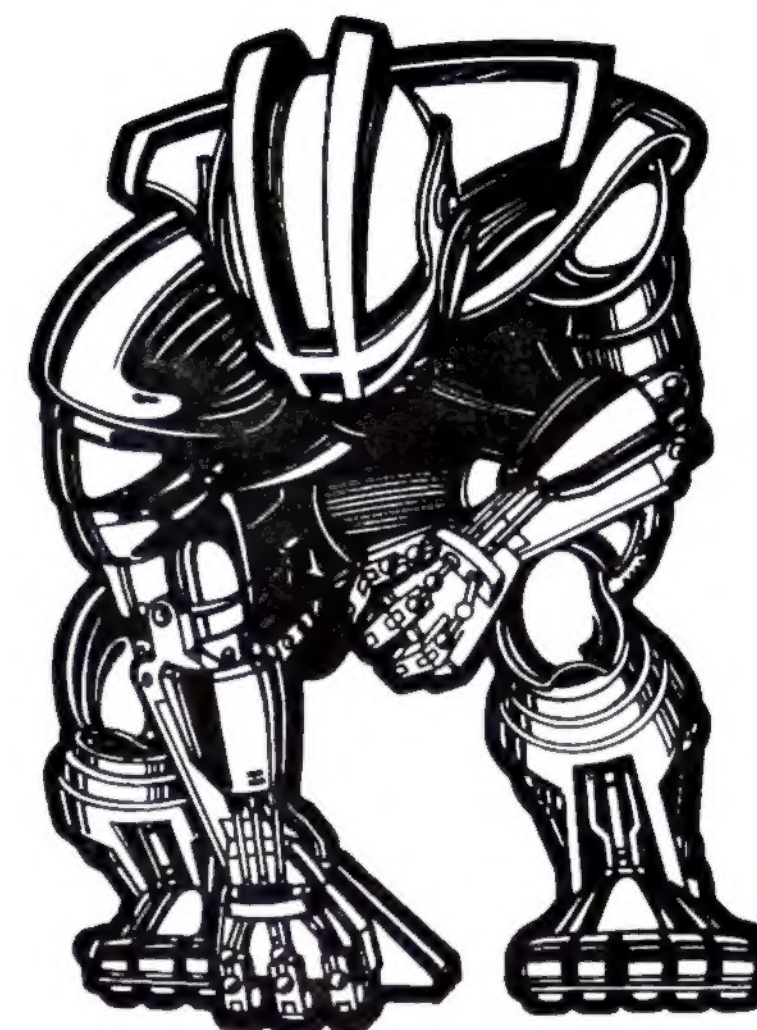
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NOTE

This staple temporarily holds the schematic package together. Remove the staple before using these schematics.



Cyberball™

Schematic Package

Supplement to the Operators Manual



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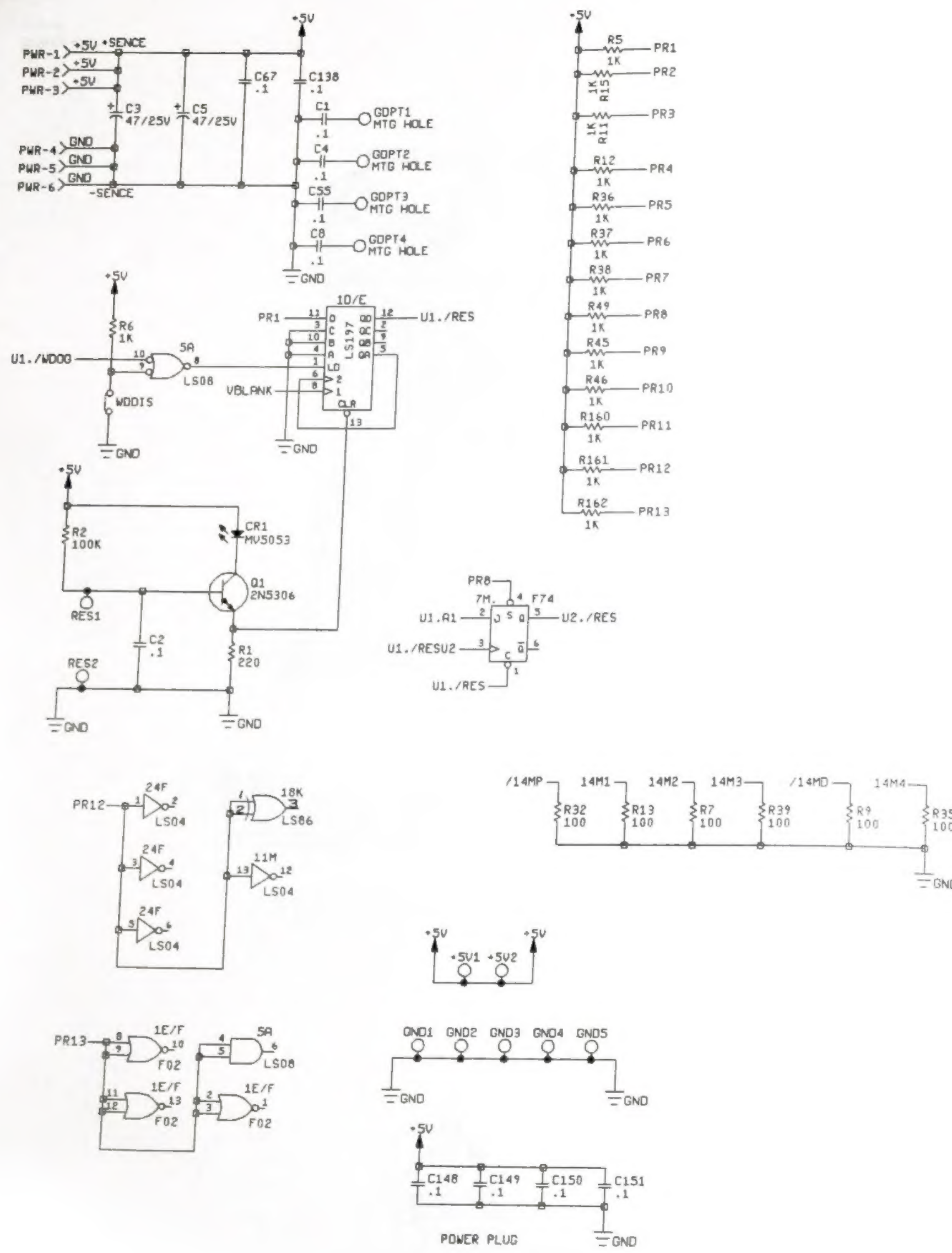


Table 1 RAM and Communication Error Messages

Error Message ¹	Display Background	Location
P2 ² —Working RAM Bad	Red	4E, 4F
Video—Left RAM Bad	Green	9K, 11K
Video—Right RAM Bad	Green	8K, 10K
Color RAM—Left Bad	Black	21M, 22M
Color RAM—Right Bad	Black	25M, 26M
P2 ² —Common RAM Bad	Blue	4E, 4F
P2 ² —Detects Communications Error ³	Purple	4E, 4F
P1 ² —Working RAM Bad	Red	4E, 4F
P1 ² —Common RAM Bad	Blue	4E, 4F
P1 ² —Detects Communications Error ³	Purple	4E, 4F

¹ If two errors are detected, for instance, P2 finds the common RAM bad and P1 finds a communications error, then the screen may be split or may have only one color. However, both messages will appear, no matter what the display background is.
² P1 and P2 are the dual microprocessors.
³ "Detects Communications Error" applies to communications problems other than the common RAM being bad.

Table 2 Faulty ROM Locations

Micro-processor	Error Address	Location on Game PCB	
P1	0	U=1M	L=1K/L
P2	0	U=3C/D	L=1B
P2	20000	U=1C/D	L=3B

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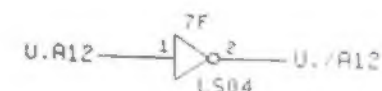
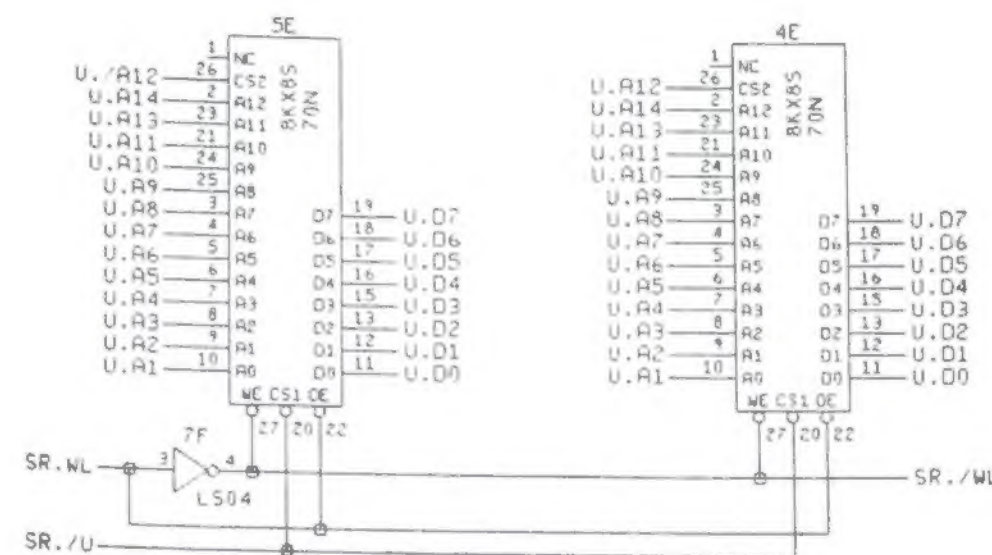
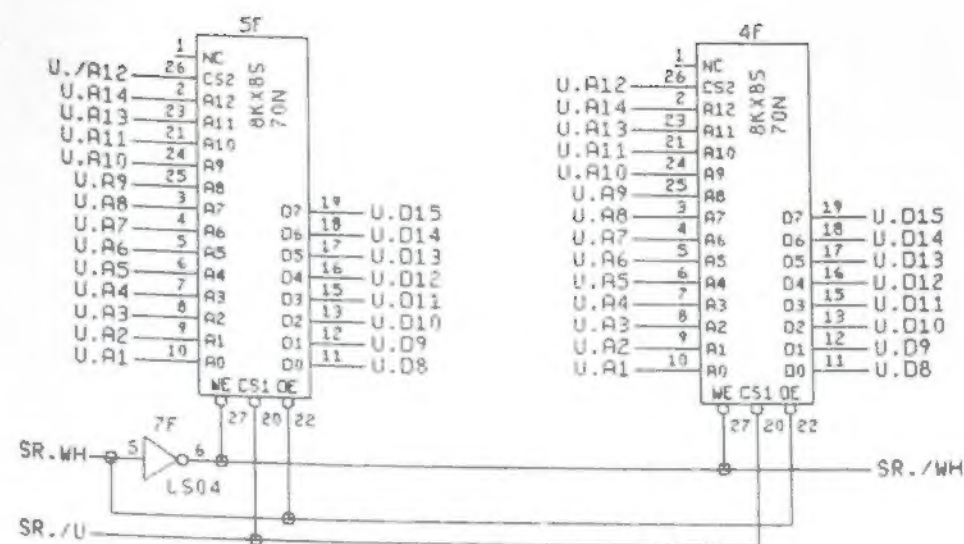
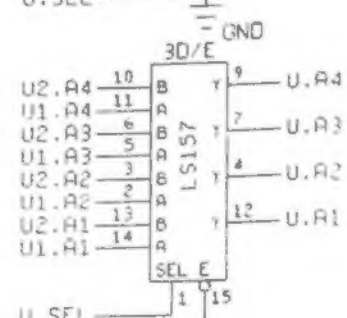
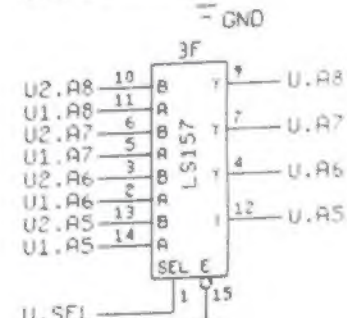
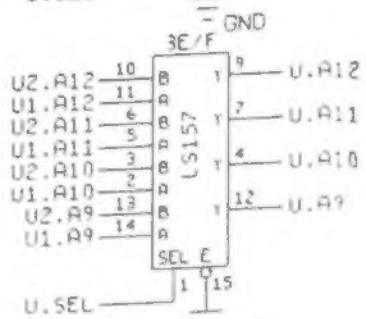
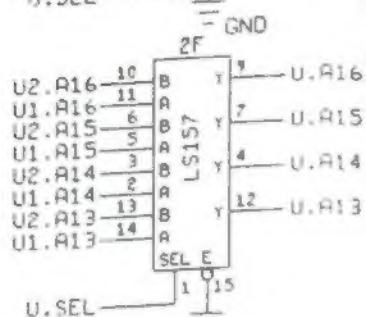
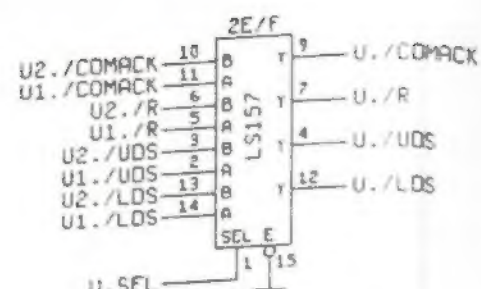
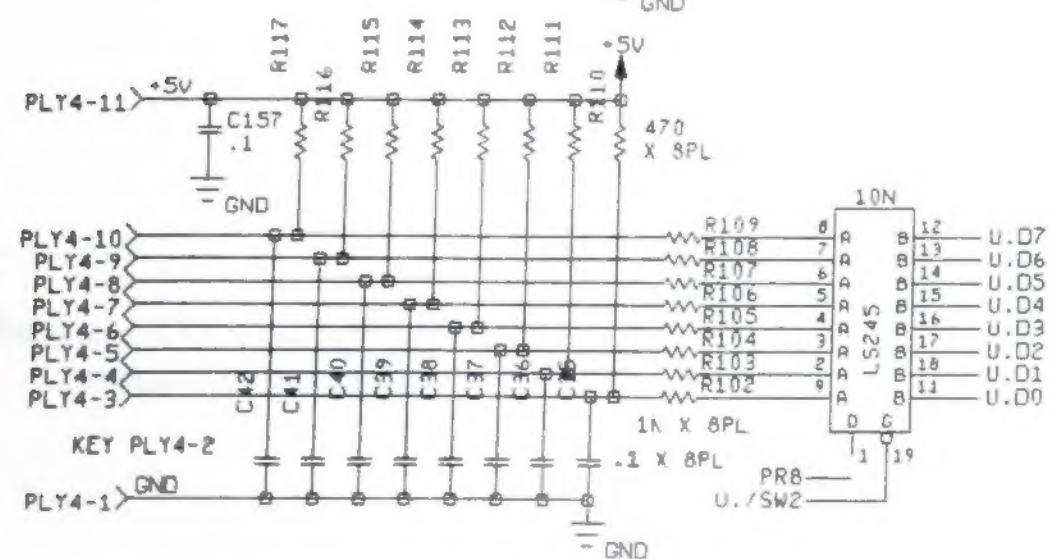
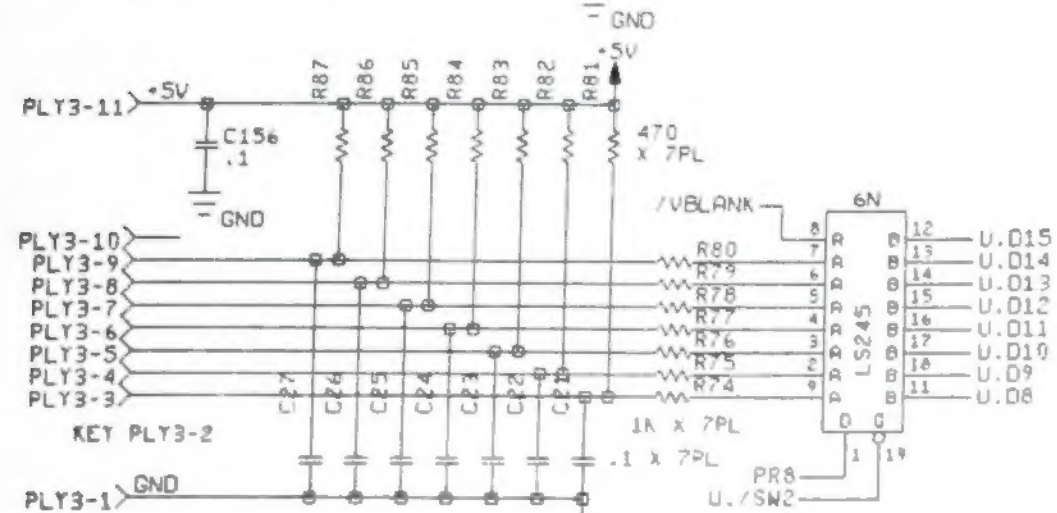
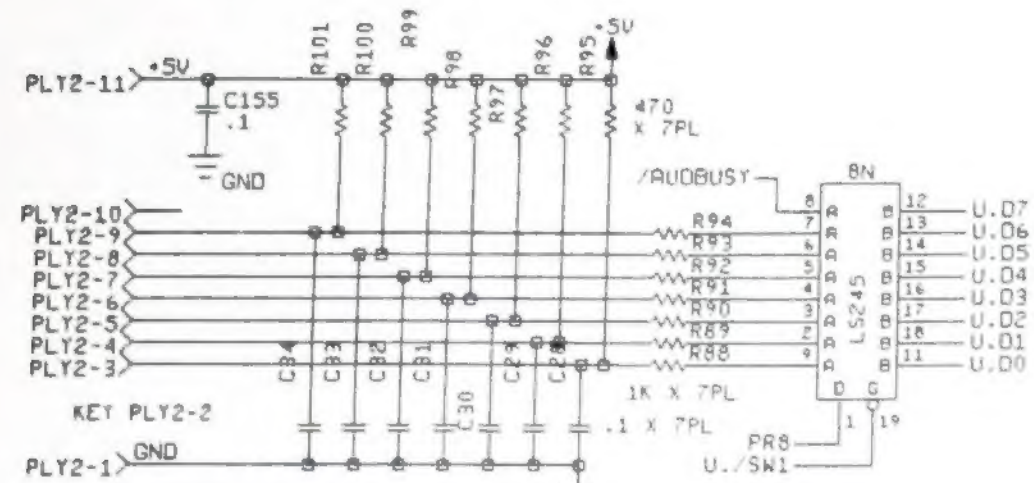
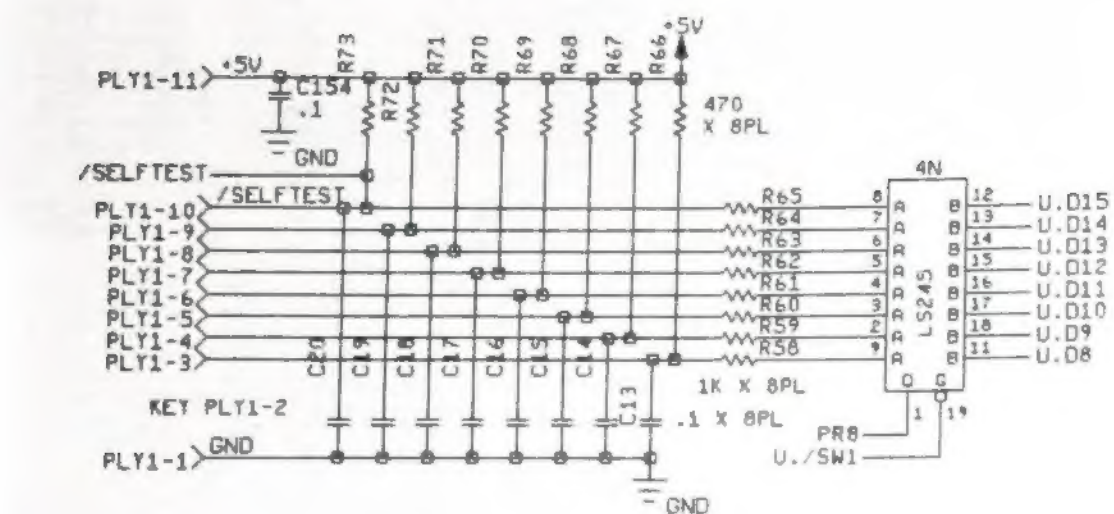
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Cyberball™ Game PCB Assembly Schematic Diagram, Faulty RAM/ROM Tables

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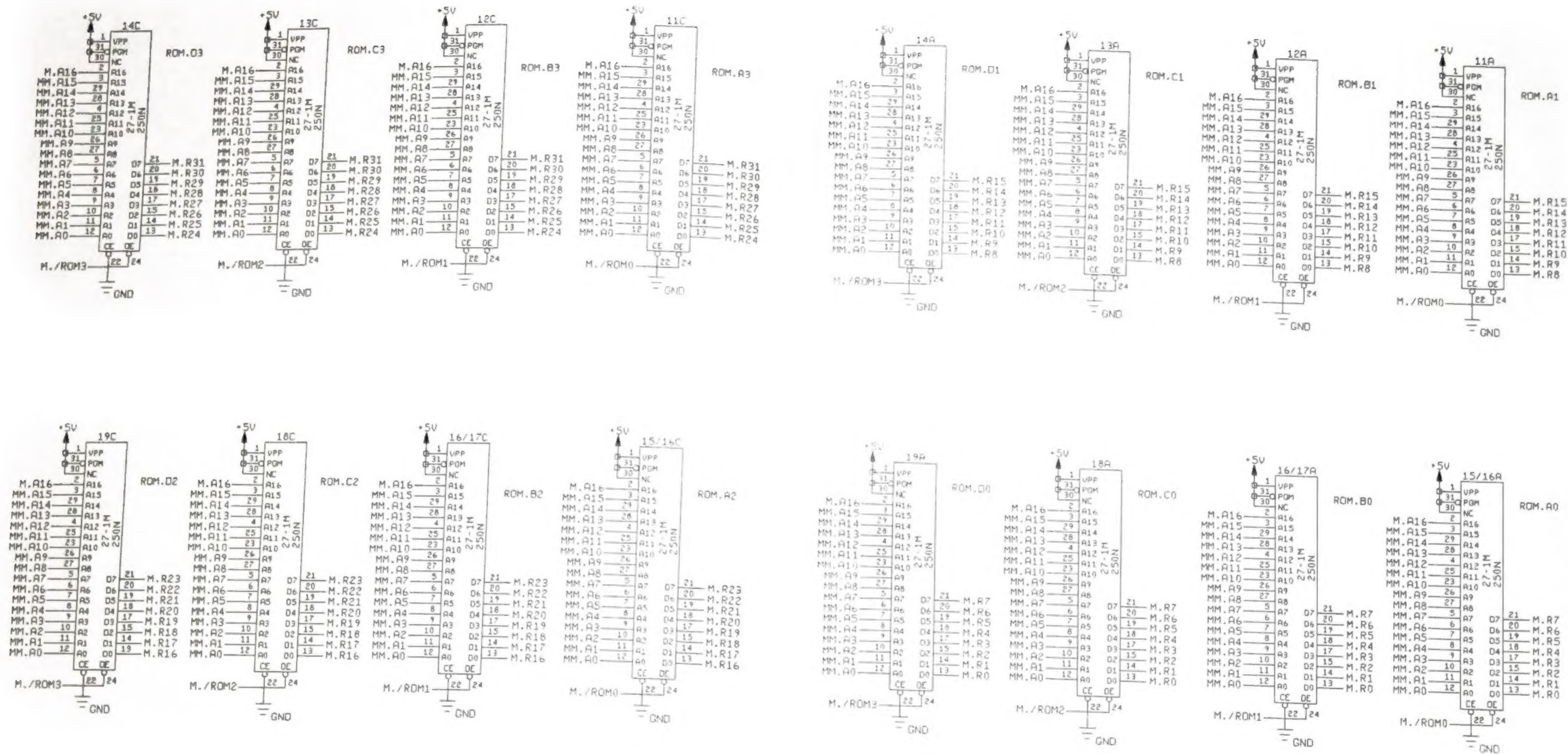
Cyberball™ Game PCB Assembly Schematic Diagram

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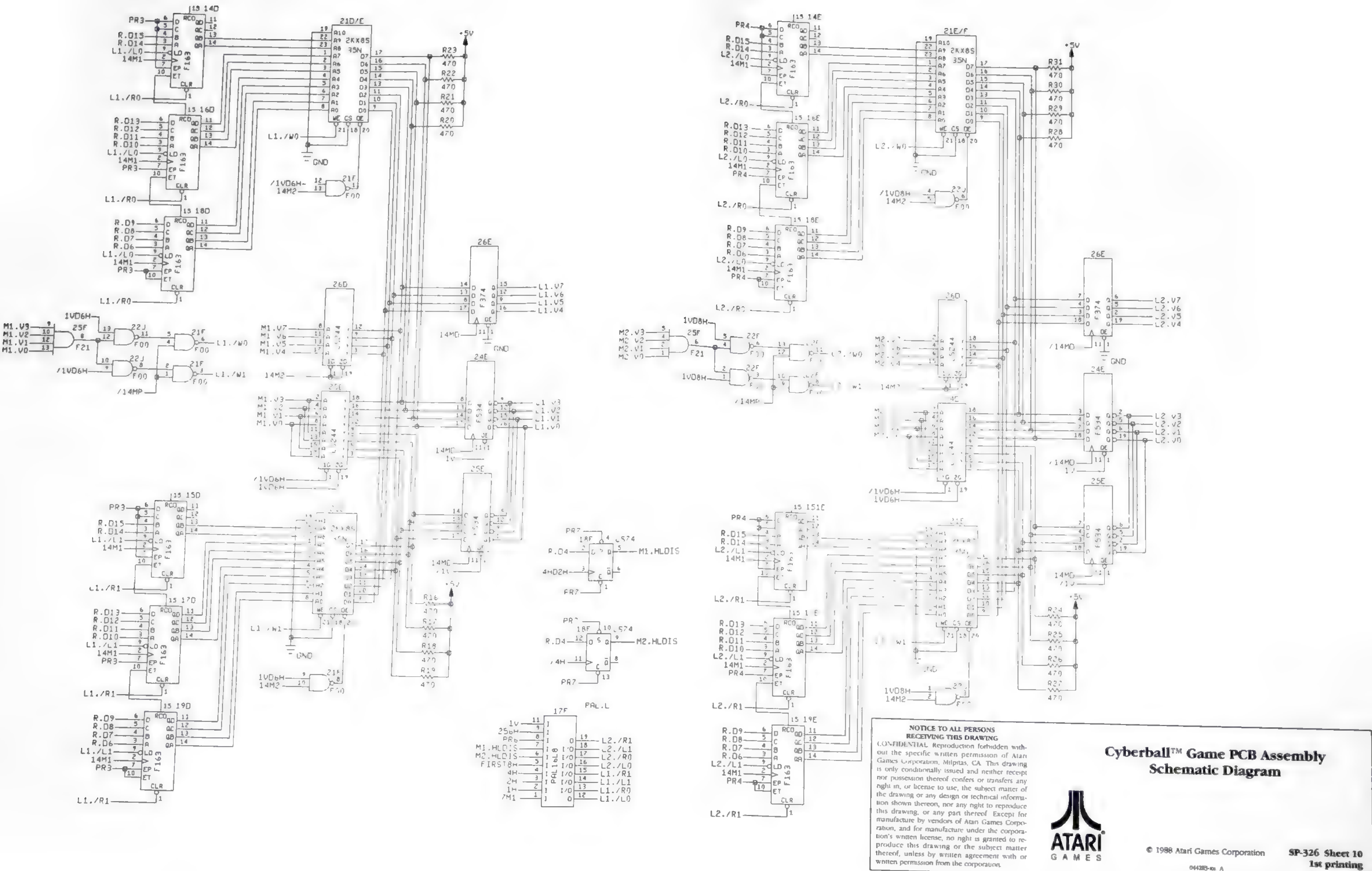
Cyberball Game PCB Assembly Schematic Diagram

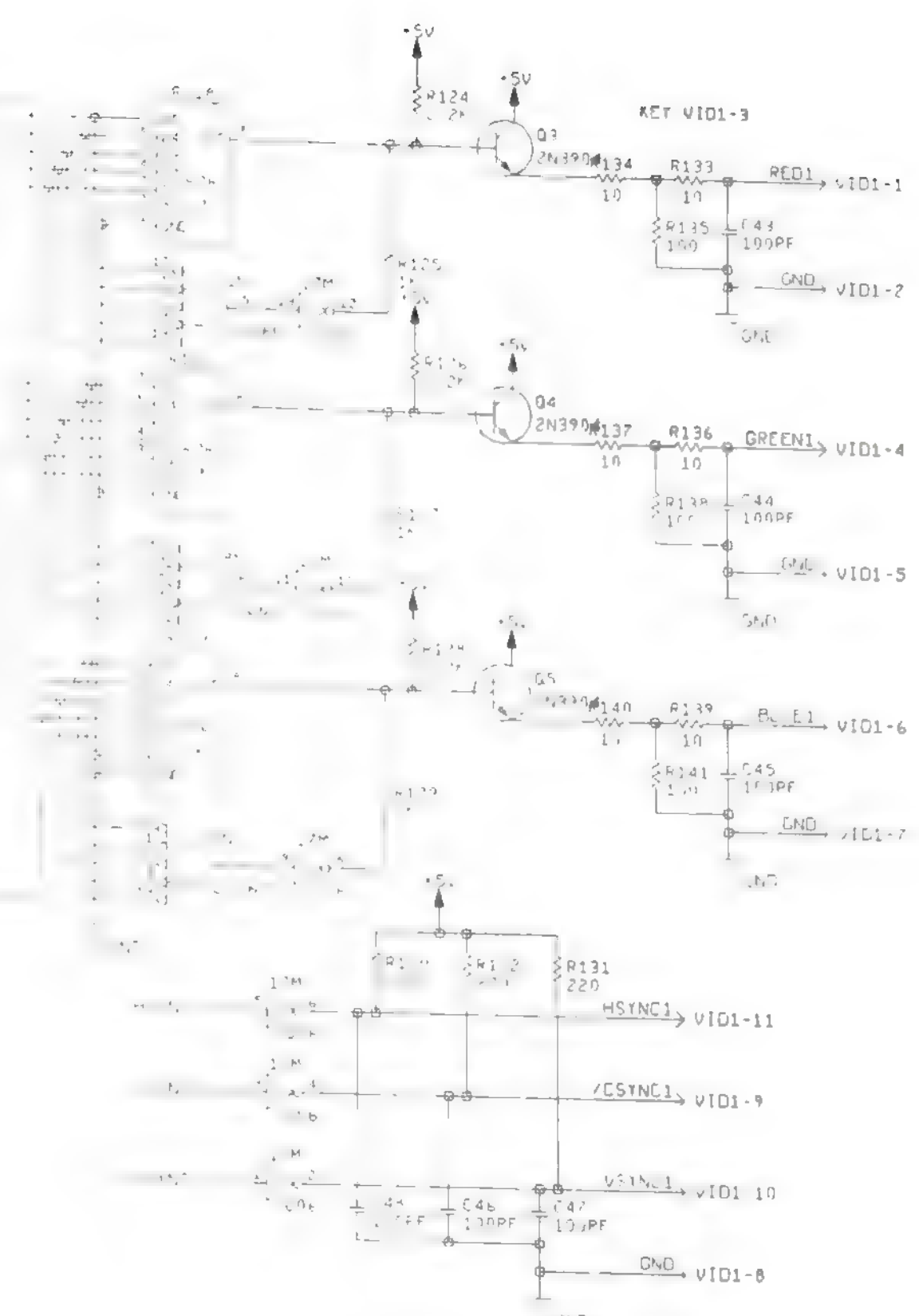


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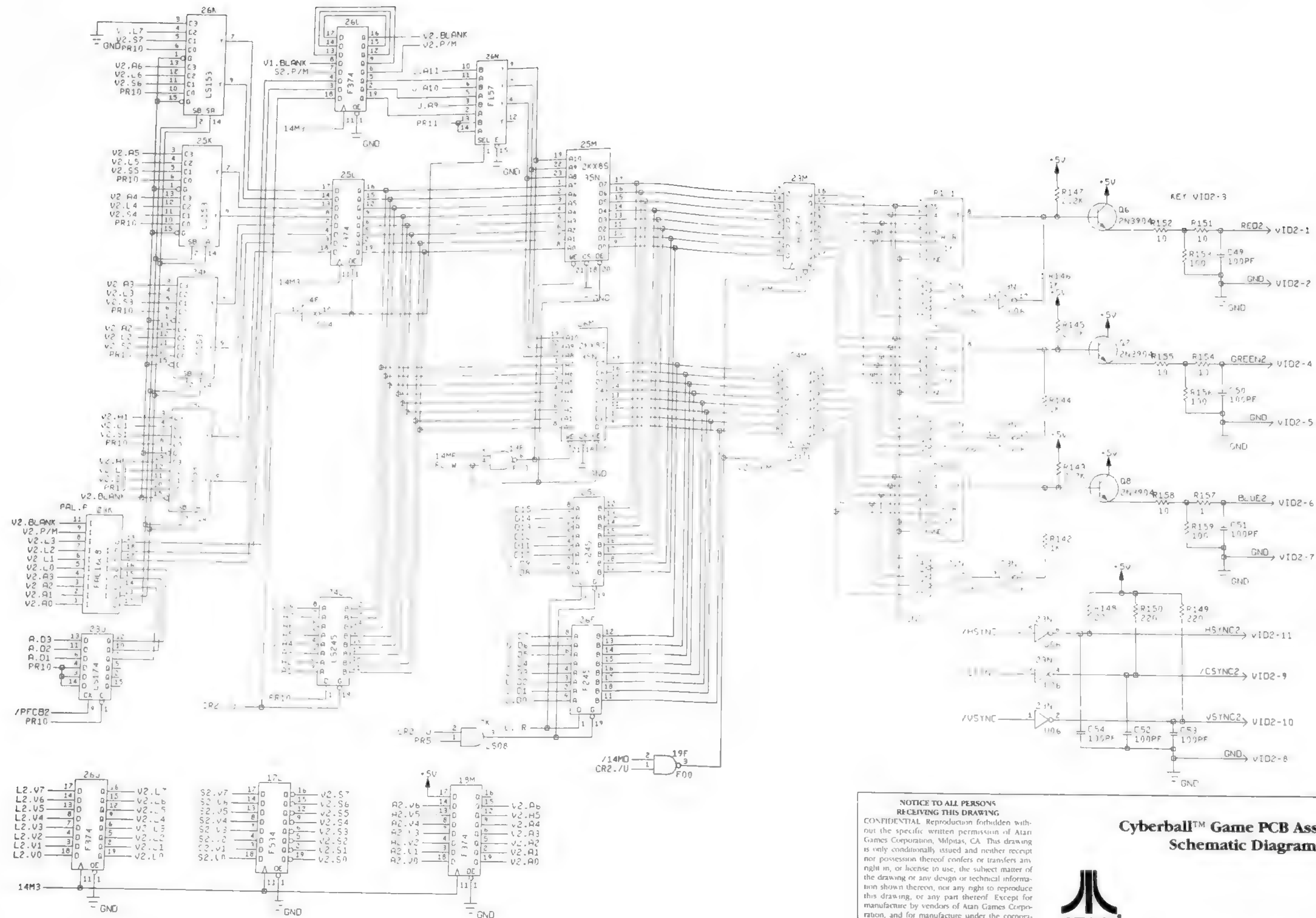
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Cyberball™ Game PCB Assembly Schematic Diagram



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Memory Map
Main Processor (P1)

Every time the main processor (P1) is reset, the video processor (P2) is also reset. P1 must clear P2's reset.

ADDRESS BUS								DATA BUS				FUNCTION	
ADDRESS	SIZE	2222	1111	1111	1100	0000	0000	1111	1100	0000	0000		
		3210	9876	5432	1098	7654	3210	R/W	5432	1098	7654	3210	
000000-007FFF	16KW	0---	000	AAAA	AAAA	AAAA	AAAA	R	DDDD	DDDD	DDDD	DDDD	SHORT ABSOLUTE PROGRAM PROM
008000-00FFFF	16KW	0---	000	1AAA	AAAA	AAAA	AAAA	R	DDDD	DDDD	DDDD	DDDD	SLAPSTIC PROGRAM PROM
010000-03FFFF	96KW	0---	0AA	AAAA	AAAA	AAAA	AAAA	R	DDDD	DDDD	DDDD	DDDD	LONG ABSOLUTE PROGRAM PROM
040000-07FFFF	28KW	0---	1AA	AAAA	AAAA	AAAA	AAAA	R	DDDD	DDDD	DDDD	DDDD	UNIMPLEMENTED PROGRAM PROM
FC0000-FC03FE	512B	1---	00	0---	AA	AAAA	AAAO	R/W			DDDD	DDDD	EEROM
FC8000		1---	00	1---	---	---	---	R			DDDD	DDDD	AUDIO READ
FD0000		1---	01	000-	---	---	---	W					FEROM UNLOCK
FD2000		1---	01	001-	---	---	---	W					AUDIO RESET
FD4000		1---	01	010-	---	---	---	W					WATCH DOG
FD6000		1---	01	011-	---	---	AA-	W					RESET P2 (ACTIVE LOW)
FD8000		1---	01	100-	---	---	---	W			DDDD	DDDD	AUDIO WRITE
FE0000		1---	10	0-00	---	---	---	R	DDDD	DDDD	DDDD	DDDD	SWITCH 1 (TEAM 1)
									D				SELF TEST
									D				UNUSED
									D				RIGHT ACTION
									D				FREEZE (DEVELOPMENT ONLY)
									DDDD				RIGHT PLAYER JOYSTICK (L,R,D,U)
										DD			UNUSED
										D			LEFT ACTION
										D			STEP (DEVELOPMENT ONLY)
									DDDD				LEFT PLAYER JOYSTICK (L,R,D,U)
FE1000		1---	10	0-01	---	---	---	R	DDDD	DDDD	DDDD	DDDD	SWITCH 2 (TEAM 2)
									D				VBLANK
									D				UNUSED
									D				RIGHT ACTION
									D				REPLAY (DEVELOPMENT ONLY)
									DDDD				RIGHT PLAYER JOYSTICK (L,R,D,U)
										DD			UNUSED
										D			LEFT ACTION
										D			UNUSED
											DDDD		LEFT PLAYER JOYSTICK (L,R,D,U)
FE8000-FE8FFE	12KW	1---	10	10--	AAAA	AAAA	AAAO	R/W	DDDD	DDDD	DDDD	DDDD	COLORAM 1
FEC000-FECFFE	12KW	1---	10	11--	AAAA	AAAA	AAAO	R/W	DDDD	DDDD	DDDD	DDDD	COLORAM 2
FF0000-FF1FFF	1KW	1---	11	000A	AAAA	AAAA	AAAA	R/W	DDDD	DDDD	DDDD	DDDD	PLAYFIELD 1 PARAMETER RAM
FF2000-FF2FFF	12KW	1---	11	0010	AAAA	AAAA	AAAA	R/W	DDDD	DDDD	DDDD	DDDD	ALPHANUMERIC 1 PARAMETER RAM
FF3000-FF3FFF	12KW	1---	11	0011	AAAA	AAAA	AAAA	R/W	DDDD	DDDD	DDDD	DDDD	MOTION OBJECTS 1 PARAMETER RAM
FF4000-FF4FFF	4KW	1---	11	010A	AAAA	AAAA	AAAA	R/W	DDDD	DDDD	DDDD	DDDD	PLAYFIELD 2 PARAMETER RAM
FF5000-FF5FFF	4KW	1---	11	010B	AAAA	AAAA	AAAA	R/W	DDDD	DDDD	DDDD	DDDD	ALPHANUMERIC 2 PARAMETER RAM
FF6000-FF6FFF	1KW	1---	11	0110	AAAA	AAAA	AAAA	R/W	DDDD	DDDD	DDDD	DDDD	MOTION OBJECTS 2 PARAMETER RAM
FF7000-FF7FFF	12KW	1---	11	0111	AAAA	AAAA	AAAA	R/W	DDDD	DDDD	DDDD	DDDD	COMMUNICATIONS RAM
FF8000-FF8FFF	4KW	1---	11	100A	AAAA	AAAA	AAAA	R/W	DDDD	DDDD	DDDD	DDDD	P2 PROTECTED PROGRAM RAM
FFA000-FFAFFF	1KW	1---	11	101A	AAAA	AAAA	AAAA	R	DDDD	DDDD	DDDD	DDDD	P1 PROTECTED PROGRAM RAM
FFC000-FFCFFF	8KW	1---	11	11AA	AAAA	AAAA	AAAA	R/W	DDDD	DDDD	DDDD	DDDD	P1 PROTECTED PROGRAM RAM

Memory Map
Video Processor (P2)

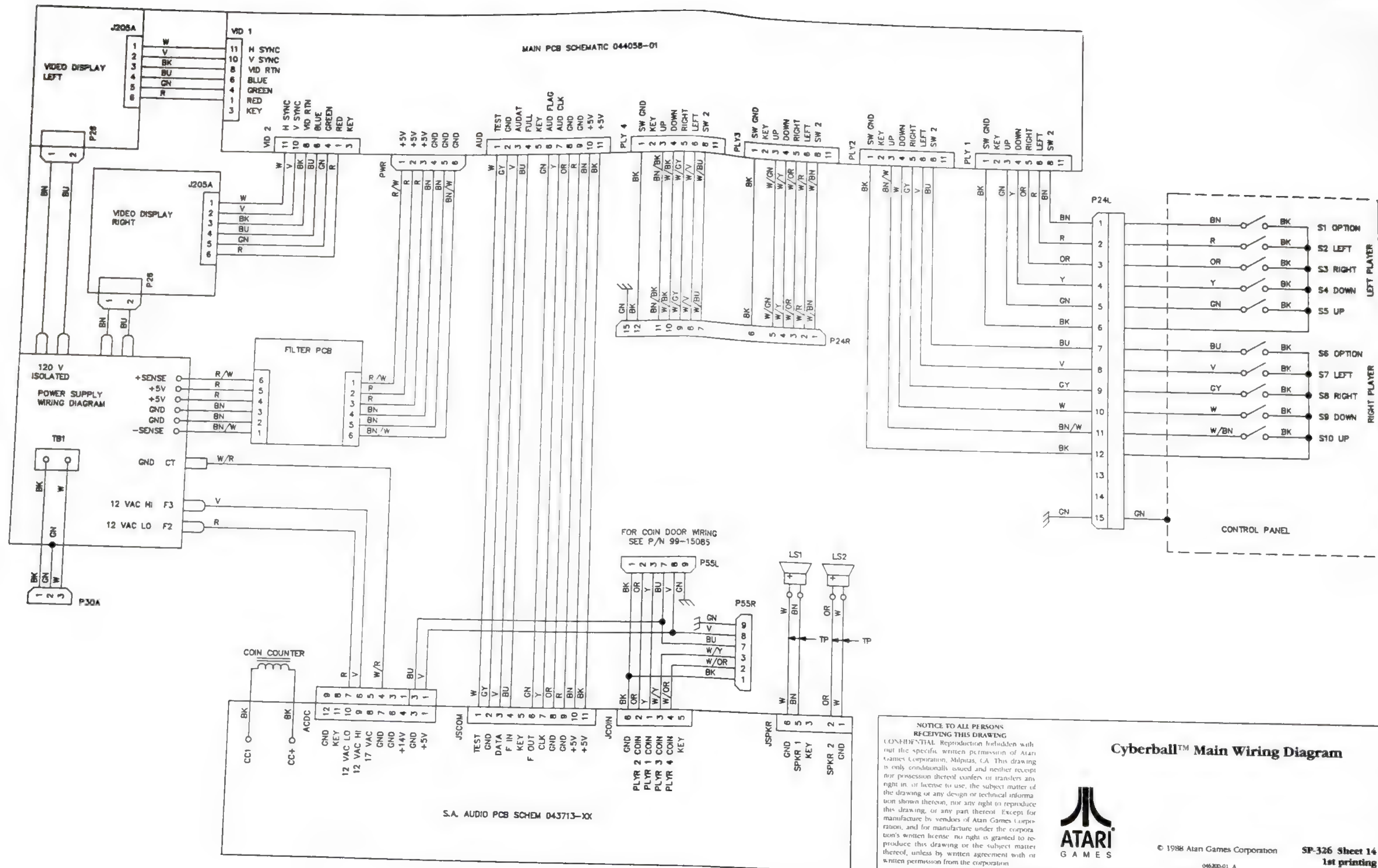
Everytime the main processor (P1) is reset, the video processor (P2) is also reset. P1 must clear P2's reset.

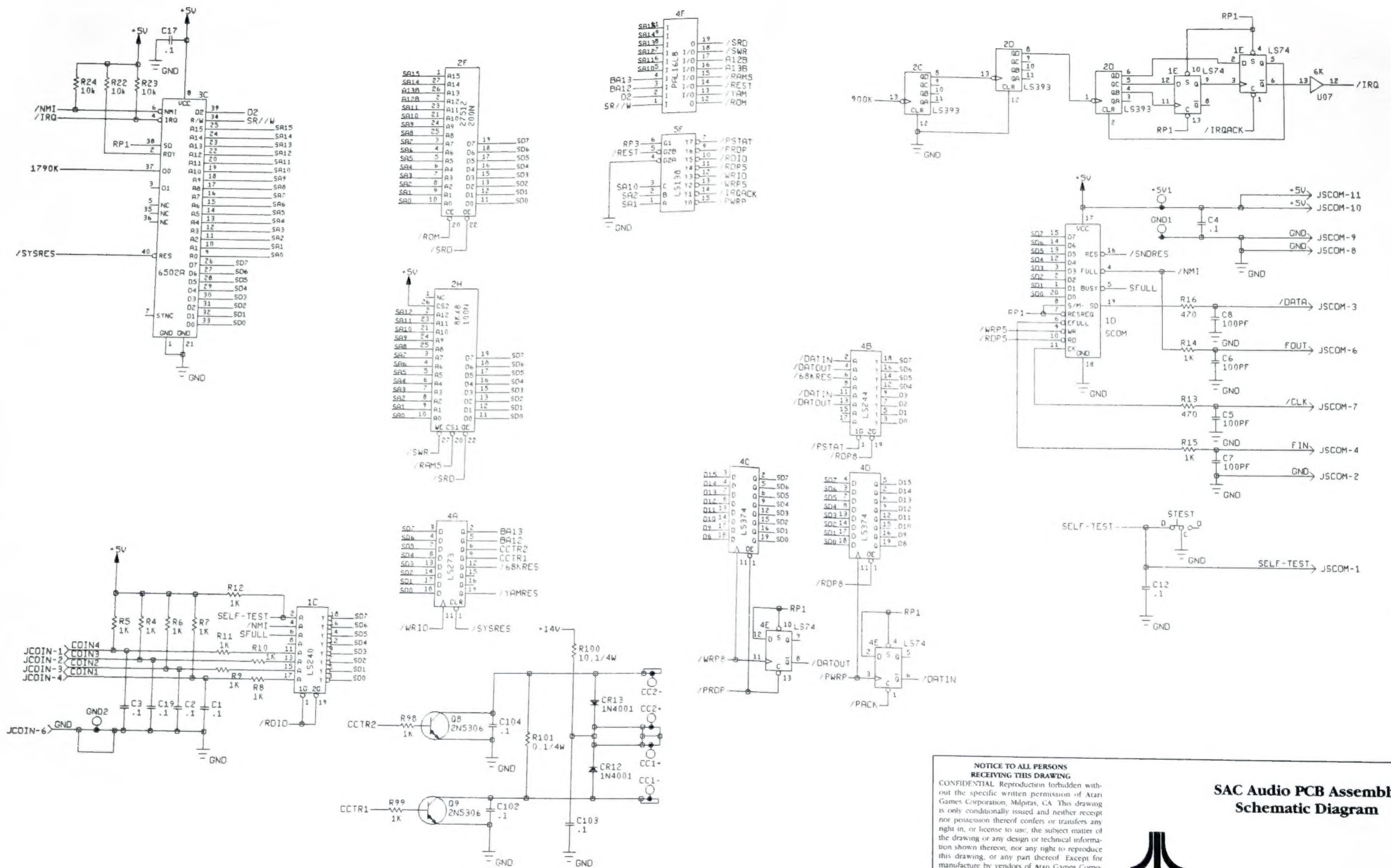
ADDRESS BUS								DATA BUS				FUNCTION
2222	1111	1111	1100	0000	0000			1111	1100	0000	0000	
3210	9876	5432	1098	7654	3210	R/W		5432	1098	7654	3210	
FE0000	FE0000	FE0000	FE0000	FE0000	FE0000	R		DDDD	DDDD	DDDD	DDDD	SHORT ABSOLUTE PROGRAM PROM
						R		DDDD	DDDD	DDDD	DDDD	LONG ABSOLUTE PROGRAM PROM
						R		DDDD	DDDD	DDDD	DDDD	UNIMPLEMENTED PROGRAM PROM
						W						SCREEN INTERRUPT ACKNOWLEDGE
						R		DDDD	DDDD	DDDD	DDDD	SWITCH 1 (TEAM 1)
								D				SELF-TEST
								L				UNUSED
								D				RIGHT ACTION
								D				FREEZE (DEVELOPMENT ONLY)
								DDDD				RIGHT PLAYER JOYSTICK (L,R,D,U)
									DD			UNUSED
									D			LEFT ACTION
									D			STEP (DEVELOPMENT ONLY)
FE1000						R		DDDD	DDDD	DDDD	DDDD	LEFT PLAYER JOYSTICK (L,R,D,U)
								D				SWITCH 2 (TEAM 2)
								D				VBLANK
								D				UNUSED
								D				RIGHT ACTION
								DDDD				REPLAY (DEVELOPMENT ONLY)
									DD			RIGHT PLAYER JOYSTICK (L,R,D,U)
										D		UNUSED
										D		LEFT ACTION
										D		UNUSED
						R/W		DDDD	DDDD	DDDD	DDDD	LEFT PLAYER JOYSTICK (L,R,D,U)
						R/W		DDDD	DDDD	DDDD	DDDD	COLORAM 1
						R/W		DDDD	DDDD	DDDD	DDDD	COLORAM 2
						R/W		DDDD	DDDD	DDDD	DDDD	PLAYFIELD 1 PARAMETER RAM
						R/W		DDDD	DDDD	DDDD	DDDD	ALPHANUMERICS 1 PARAMETER RAM
						R/W		DDDD	DDDD	DDDD	DDDD	MOTION OBJECTS 1 PARAMETER RAM
						R/W		DDDD	DDDD	DDDD	DDDD	PLAYFIELD 2 PARAMETER RAM
						R/W		DDDD	DDDD	DDDD	DDDD	ALPHANUMERICS 2 PARAMETER RAM
						R/W		DDDD	DDDD	DDDD	DDDD	MOTION OBJECTS 2 PARAMETER RAM
						R/W		DDDD	DDDD	DDDD	DDDD	COMMUNICATIONS RAM
						R/W		DDDD	DDDD	DDDD	DDDD	P2 PROTECTED PROGRAM RAM
						R/W		DDDD	DDDD	DDDD	DDDD	P1 PROTECTED PROGRAM RAM

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Cyberball™ Memory Map





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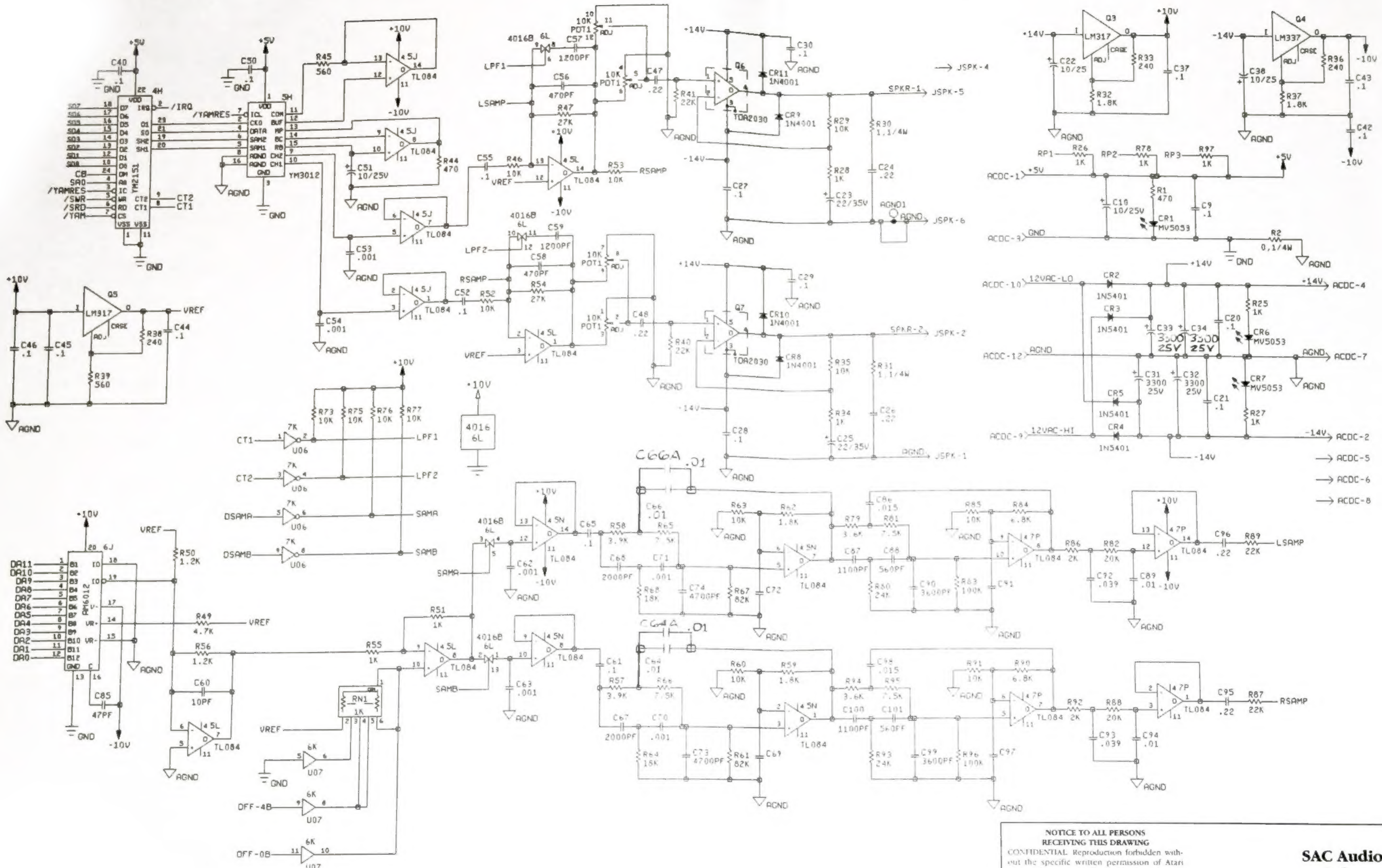


SAC Audio PCB Assembly Schematic Diagram

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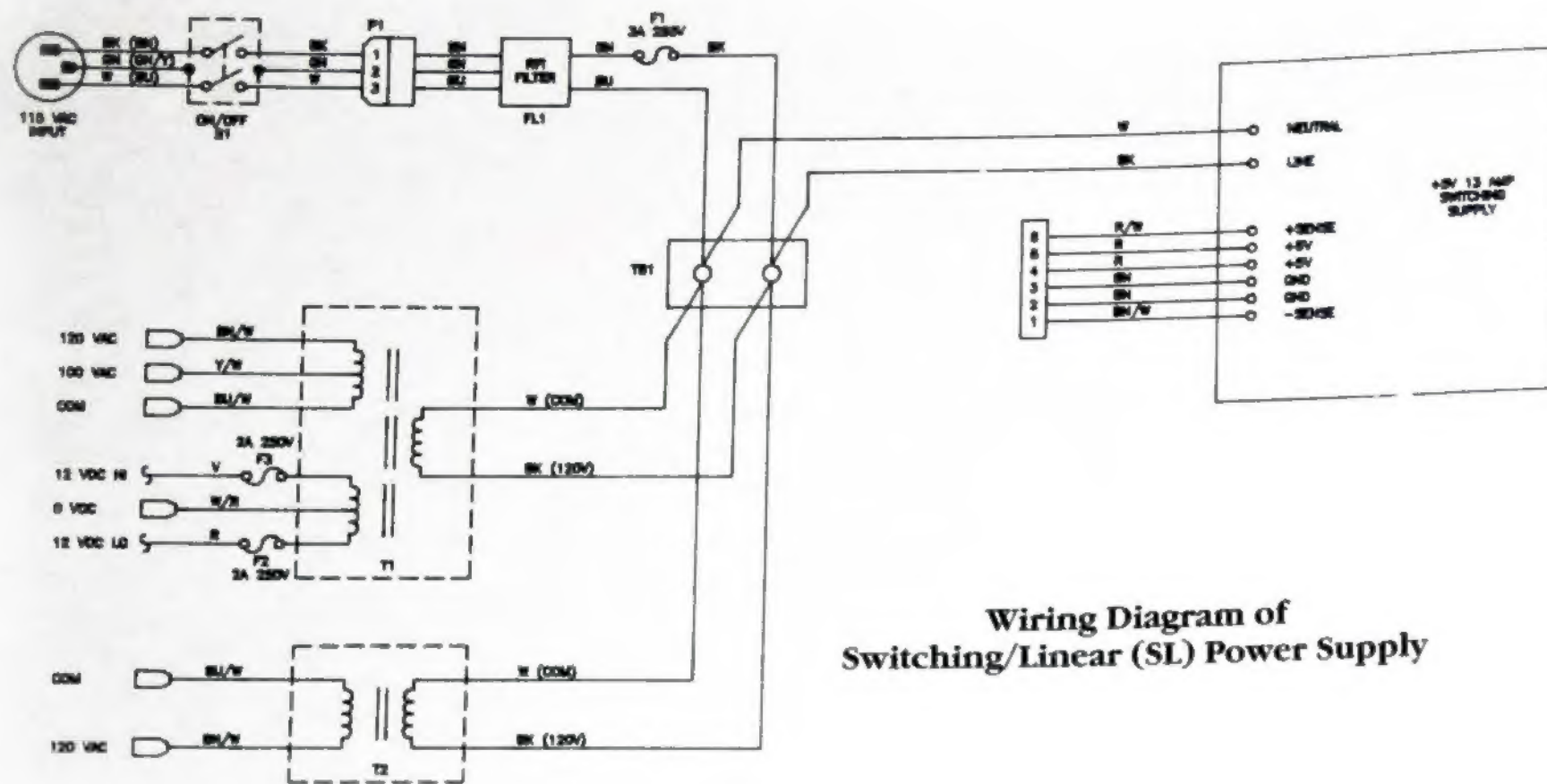
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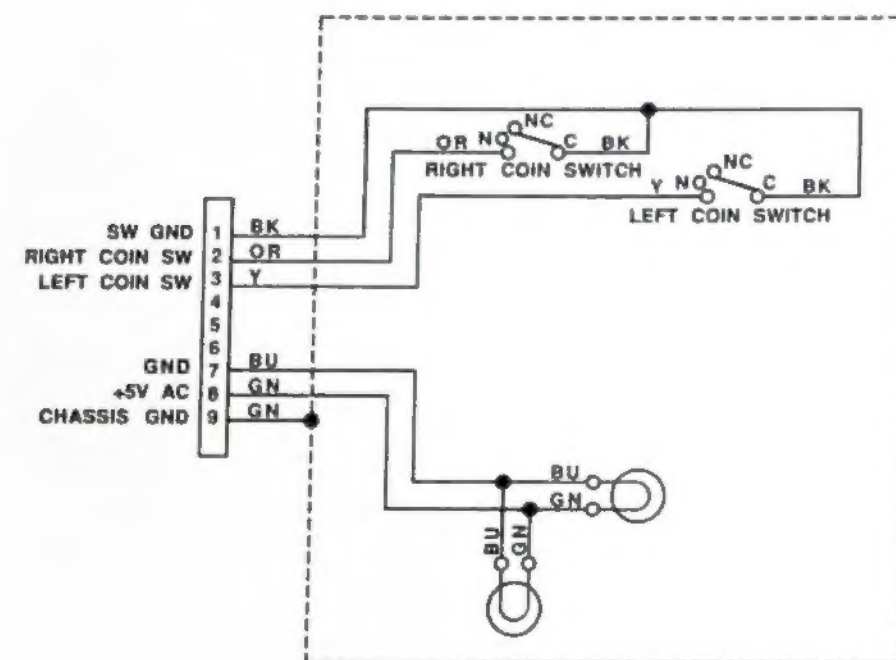
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SAC Audio PCB Assembly Schematic Diagram

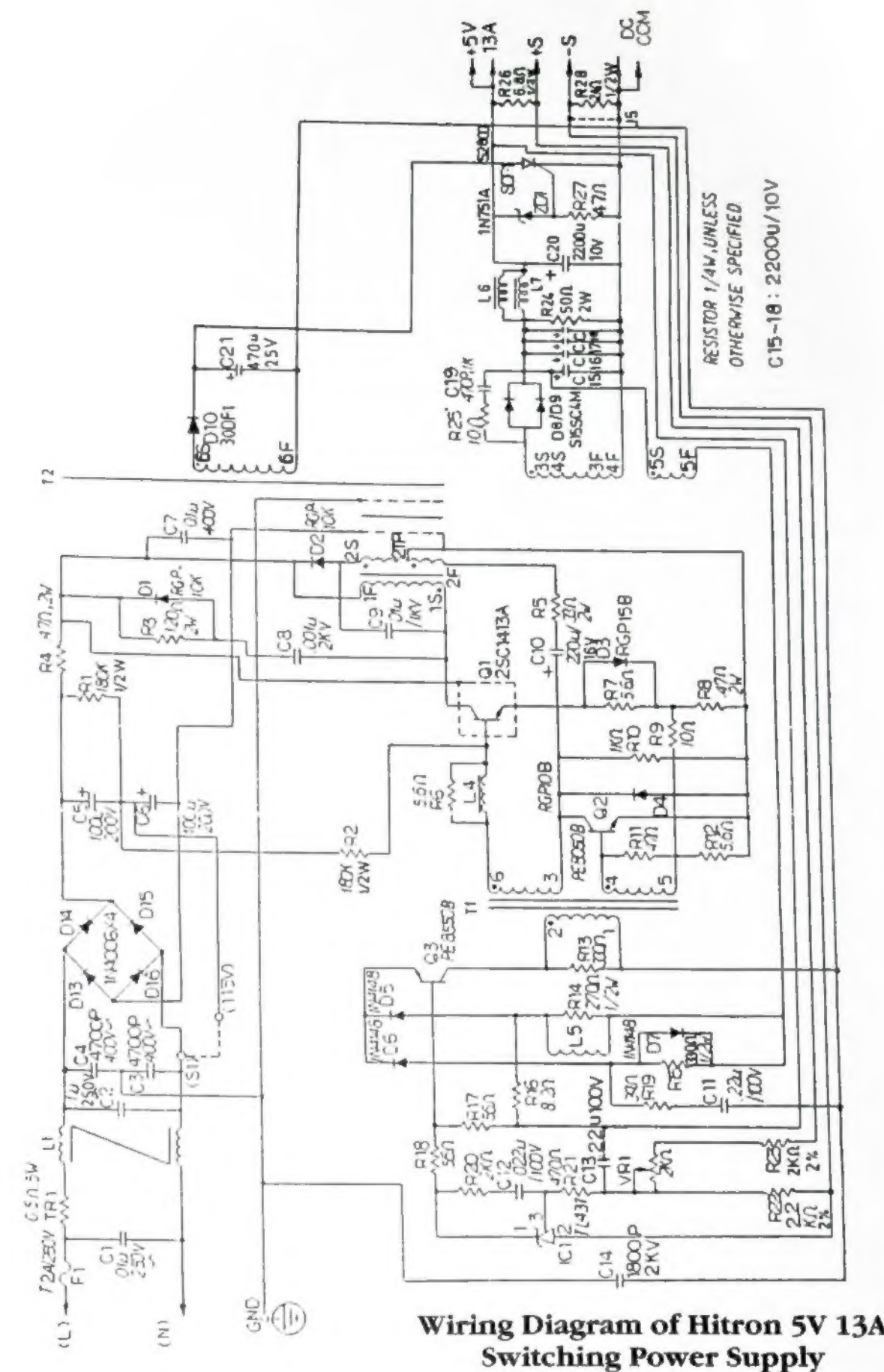




Wiring Diagram of
Switching/Linear (SL) Power Supply



Coin Door Wiring Diagram



Wiring Diagram of Hitron 5V 13A
Switching Power Supply

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Wiring Diagrams of Switching/Linear (SL)
Power Supply, Hitron 5V 13A Switching
Power Supply, and Coin Door

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